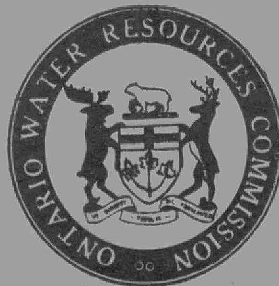


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*O.W.R.C.
Water Pollution
Survey*

THE
ONTARIO WATER RESOURCES
COMMISSION



WATER POLLUTION SURVEY

of the

TOWN OF THESSALON

DISTRICT OF ALGOMA

1969

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R E P O R T

on

WATER POLLUTION SURVEY

of the

TOWN OF THESSALON

District of Algoma

June, 1969

Ontario Water Resources Commission

District Engineers Branch

Division of Sanitary Engineering

ACKNOWLEDGEMENTS

The field work associated with the preparation of this report was greatly expediated due to the assistance received from Mr. Normand Guigere, Algoma and District Health Unit and Mr. F. Valley, Town Foreman, Town of Thessalon.

Laboratory work carried out in conjunction with the survey was performed by the Public Health Laboratories in Sault Ste. Marie and by the Ontario Water Resources Laboratories in Toronto.

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R E P O R T

ONTARIO WATER RESOURCES COMMISSION

1. INTRODUCTION

A water pollution survey was conducted in the Town of Thessalon on June 4 and 5, 1969, in an effort to locate and evaluate most existing sources of pollution. Surveys of this nature are performed upon request by the OWRC's District Engineers Branch, Division of Sanitary Engineering, as an aid for determining water supply and sewage treatment requirements.

During the survey, 113 sewage outfalls were observed 30 of which were sampled. At the time of the survey the temperature was approximately 70° F. and skies were clear. No heavy rainfall had occurred for several days preceding the survey.

2. GENERAL

The Town of Thessalon has depended upon the lumber industry since its beginning around the turn of the eighteenth century. The town is located just south of the King's Highway number 17 at its junction with Highway number 229, lying at the mouth of the Thessalon River at Lake Huron. Thessalon is serviced by a deep sea harbour, the Canadian Pacific Railway and the Trans Canada Highway.

Map No.1 (Appendix C) is a plan view of the town

showing the existing sewer mains. The entire town is serviced by a water distribution system. At present, the domestic water supply is obtained from Lake Huron by a municipality owned and operated pumphouse where it is chlorinated and then distributed to the consumer for use. The sewer system shown on the map discharges to the Thessalon River at several points along its shores. In addition to these major discharge points which drain mainly the downtown area, there exist well over one hundred privately owned domestic sewer discharges along both the east and west banks of the river.

According to the 1969 Municipal Directory, the population of Thessalon was 1,625 persons. The population area of the town is divided equally by the Thessalon River.

The major industry of the town is associated with lumber. There are three companies, mainly Fleron Lumber, Midway Lumber and Birchland Veneer. The latter appears to have associated with it the greater water pollution problem. In addition to the lumber industry, many residents of the town obtain their livelihood from the tourist trade as well as from employment by the Department of Lands and Forests and Highways of Ontario. Map number 2 (Appendix C) shows the expected land use pattern as predicted by Proctor & Redfern (1967).

Map number 3 (Appendix C) illustrates the soil formations predominating in the town.

2.1 Past Pollution Surveys

The first pollution survey of the Thessalon River was carried out by the District Engineers Branch in June 1961. The results of that survey stated that "active consideration should be given to a system of sewage collection and treatment which will relieve the existing pollution".

During June 1962 a further survey was conducted, again by the same branch of the OWRC, and it was again recommended that "the Town of Thessalon discontinue the practice of discharging waste water to the Thessalon River" by taking action towards the construction of a sewage collection system with associated treatment facilities.

There have been no additional pollution surveys carried out since that time until the June 4 and 5, 1969 survey.

3. WATER SUPPLIES

3.1 Municipal Water Supply

A municipal water supply system to service the Town of Thessalon was constructed in 1965.

Water flows by gravity from the North Channel (Lake Huron) to a wet well through a 24-inch diameter corrugated pipe which extends 800 feet into the lake. The pumphouse, located on the west side of the town, is equipped with two 3-stage verticle turbine pumps each rated at 480 US gpm and one 2-stage standby pump with a capacity of 2200 US gpm. The latter is operative

on either electric or diesel power and serves largely in case of fire or power failure. The system mains range in size from 1 1/2 to 6-inch diameter and the pressure is maintained by the pumps only. No standpipe or other storage is present.

The 1968 water consumption figures obtained from the OWRC inspection report dated January 28 and March 11, 1969, indicate that 194 imperial gallons of water were used by each person daily. This is considered to be abnormally high.

3.2 Private Water Supplies

The only private water supplies found during the survey were associated with two industrial operations. The Midway Lumber Company pumps water for industrial use only from the Thessalon River at a point approximately 2 miles north of the downtown area and the Birchland Veneer Company pumps industrial water from the North Channel. The former company reported recirculating the entire quantity of water taken in during their operations while the latter reported a continuous flow type operation. A serious water pollution problem is consequently associated with the operation of the latter industry.

4. WATER USES

The water in Thessalon is used mainly by the Municipal consumers, however, a great tourist trade in the area is dependent upon the quality of the surrounding watercourses.

4.1 Municipal

There are approximately 470 domestic, 75 commercial and 3 industrial services on the municipal water supply system using a combined volume of 316 thousand gallons annually.

4.2 Recreational

There are two water bodies used by the residents of Thessalon and the tourist trade. These are the Thessalon River and the North Channel. Pollution surveys carried out in the past by the OWRC indicated that the former is heavily polluted - especially south of the Highway 17 east bridge. This pollution, of course, gains access to the North Channel and is consequently of great concern. Swimming in the river has been prohibited for many years due to the high coliform counts obtained.

4.3 Agricultural

The agricultural use of the waters associated with this survey is negligible.

5. WATER POLLUTION

The major sources of water pollution are due to the domestic wastes being discharged directly into the river and the industrial wastes gaining access to the North Channel.

5.1 Municipal Waste Disposal

There are no sanitary sewers or sewage treatment facilities in the municipality. The business section east of the

Thessalon River is served with combined sewers. Sanitary wastes from this system are discharged untreated to the Thessalon River via four outlets, namely: 1. Genelle Street 2. Lorne Street 3. Huron Street 4. Algoma Street. Numerous private outlets are tributaries to the river on both banks. A visual observation revealed 32 on the east side and at least three times that many on the west bank. All of the combined sewers plus 31 of the private outfalls (including a hospital and a home for the aged) were sampled during the course of this pollution survey. The latter are referred to as river samples in this report since their points of entry into the river were submerged. Consequently, actual outfall samples (undiluted) could not be obtained.

5.2 Industrial Waste Disposal

The Birchland Veneer Company has associated with its operation a pollution problem. Wood veneer materials are produced at this plant and the wastes associated with this operation are discharged into a small lagoon located near the lakeshore. Overflow and seepage from this facility was noted to be oily and tar-like and appeared to be continuous during this survey. A sample obtained from the point of entrance into Lake Huron showed an excessive concentration of phenol and 5-Day BOD.

6. FIELD SURVEY

The field work associated with this survey was carried out on June 4 and 5, 1969. A boat was used on June 4 to aid in

the locating and sampling of the various combined sewer and private discharge points. The weather at that time was sunny and hot and the aesthetic impact of the river was nauseating. Fecal matter, toilet paper and wastes were continuously observed floating down the river and cluttering the shoreline. A typical septic odour was predominant along both banks.

The east bank receives discharges from the O.P.P. complex, numerous private domestic sewer outfalls, storm drainage and the four downtown combined sewer discharges. A total of thirty-three combined and domestic outfalls were counted on this side of the river alone and fifteen of them were sampled.¹

The west side of the river is mainly the residential side of the river and as such receives mainly domestic wastes from private homes. Most of the outfalls are of 4-inch tile, however, several 6-inch outfalls were seen. These outfalls service small side streets. The Red Cross hospital and a Home for the Aged also discharge their wastes into this side of the river. Both of these facilities have submerged effluents, as do many of the private outfalls along either sides of the river. On both days of the survey the former was discharging large volumes of coloured wastes. The total number of outfalls into the river from the west end greatly exceeded that of the east side. A conservative estimate would be eighty discharge points, fifteen of which were sampled.

¹See map number 1.

The number sampled included basically only the larger outfalls and those which appeared to service more than one dwelling.

7. RESULTS OF THE ANALYSES

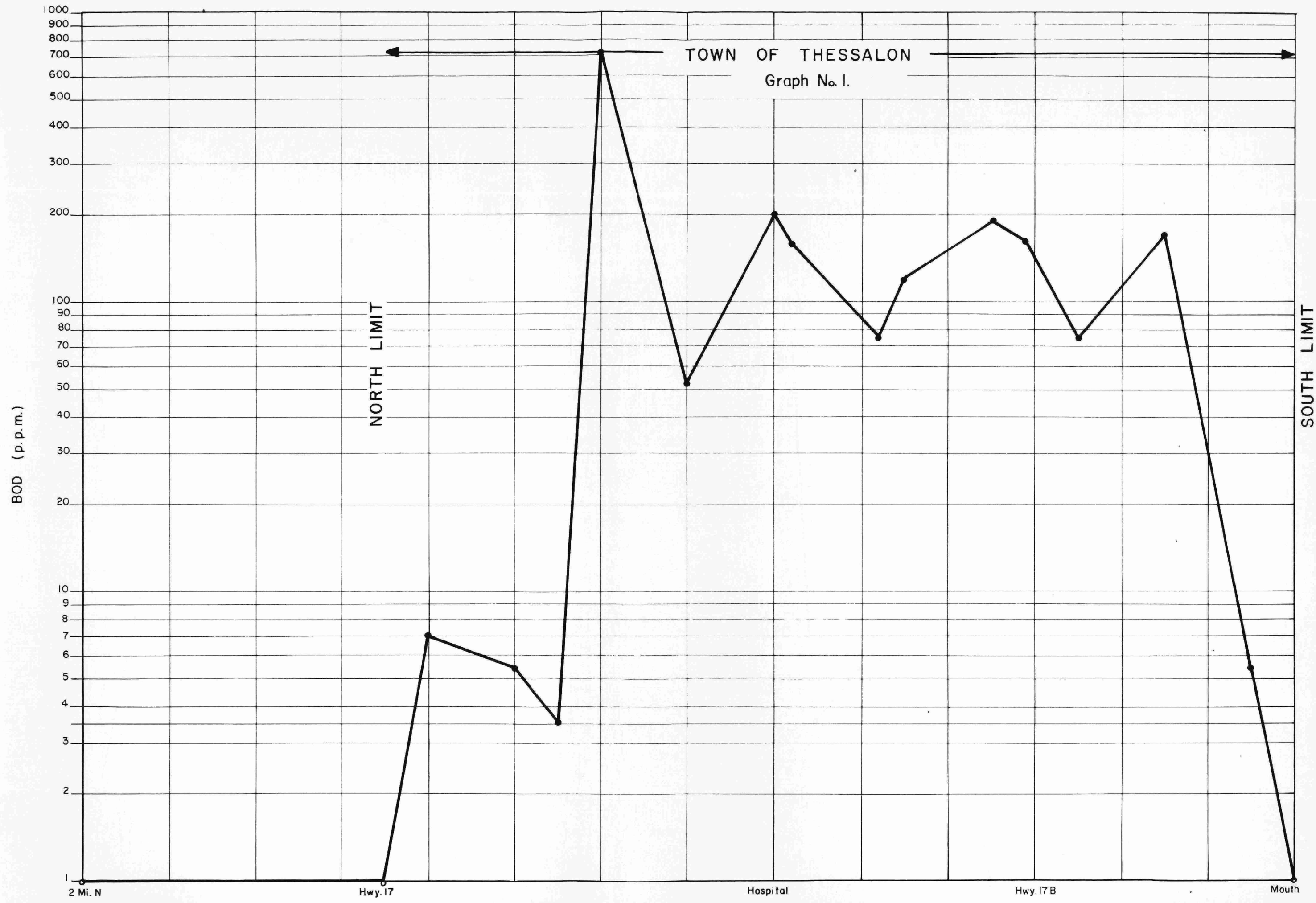
The analytical results of all bacteriological and chemical samples obtained during the survey are listed in Table I. The bacteriological examinations were performed at the Public Health Laboratories in Sault Ste. Marie and the chemical analyses by the OWRC's Division of Laboratories in Toronto. Reference should be made to Appendix A for an explanation and significance of the various analyses performed. The code letters used in numbering the sampling stations indicate whether the sample was of the river (R), lake (L), or sewer (S), and whether it was taken on the east (E) or west (W) bank of the river.

A total of 38 samples were obtained and analysed for chemical and bacterial content. Of these samples, 18 were collected from the river, 18 from sewer outfalls, and two from Lake Huron.

8. DISCUSSION OF THE RESULTS

The data presented in Table I indicates that the Thessalon River is being grossly polluted by domestic wastes as it flows through the town area. Graph number 1 illustrates clearly the effect of the town discharges on the river as it passes by the built-up area lying between the Highway 17 bridge and the

TOWN OF THESSALON - BOD LOADINGS RECEIVED WITHIN TOWN LIMITS



TOWN OF THESSALON

Graph No. 1.

NORTH LIMIT

SOUTH LIMIT

2 Mi. N Hwy. 17 Hospital Hwy. 17 B Mouth

TABLE I

SAMPLING STATION	LOCATION	DATE SAMPLED	5-DAY BOD	SOLIDS			ABS	MF COLIFORM PER 100 ML	FECAL COLIFORM PER 100 ML
				TOTAL	SUSP.	DISS.			
1 - R	HWY. 17 - B BRIDGE	JUNE 5	0.4	80	15	65	0.1	1,500	900
2 - RE	HURON ST. AREA	JUNE 4	0.6	110	40	70	0.1	60,000	20,000
3 - RE	ALGOMA ST.	JUNE 4	0.6	90	20	70	0	390,000	70,000
4 - SE	ALGOMA ST. S. AREA	JUNE 4	75	620	290	330	0.3	>1,000,000	>10,000
5 - SE	RIVER ST. AREA	JUNE 4	170	560	260	300	0.4	900	0
6 - RE	DOBIE ST.	JUNE 4	1.0	130	30	100	0.1	55,000	5,000
7 - SE	DOBIE ST. S. AREA	JUNE 4	14	200	100	100	0.1	>1,000,000	>10,000
8 - R	MOUTH OF THESSALON R.	JUNE 4	0.4	90	15	75	0	13,000	6,000
9 - SW	BARBARA ST. S. AREA	JUNE 4	5.5	150	60	90	0.1	200,000	20,000
10 - SW	BARBARA ST.	JUNE 4	1.6	150	60	90	0.1	1,500	1,500
11 - SW	WATER ST. AREA	JUNE 4	12	150	50	100	0	350,000	16,000
12 - SW	FRANCES ST.	JUNE 4	160	870	90	780	44.0	1,000,000	10,000
13 - RW	FRANCES ST. W.	JUNE 4	1.0	90	10	80	0	6,000	4,000
14 - RE	WATER ST. AREA	JUNE 4	190	370	90	280	0.8	24,000,000	2,300,000
15 - RW	WATER ST. AREA	JUNE 4	17	270	80	190	2.0	>1,000,000	>10,000
16 - RW	WATER ST. AREA	JUNE 4	120	520	220	300	8.0	700,000	350,000
17 - RW	HOSPITAL AREA	JUNE 4	200	670	370	300	0.7	1,100,000,000	64,000,000
18 - SW	WATER ST. AREA	JUNE 4	42	420	230	190	0.4	>1,000,000	>10,000,000
19 - RW	RIVER AT GOVERNMENT RD	JUNE 4	1.2	90	20	70	0.1	14,000	14,000
20 - SW	CHURCH ST. AREA	JUNE 4	1.6	130	40	90	0	90,000	6,000
21 - SW	WATER ST. AREA	JUNE 4	700	2270	1030	1240	2.0	>1,000,000	>10,000

NOTE:

R = RIVER

S = SEWER

E = EAST SIDE

W = WEST SIDE

L = LAKE

> = GREATER THAN

TABLE - I CONT'D.

SAMPLING STATION	LOCATION	DATE SAMPLED	5-DAY BOD (PPM)	SOLIDS			ABS (PPM)	MF COLIFORM PER 100 ML	FECAL COLIFORM PER 100 ML
				TOTAL (PPM)	SUSP. (PPM)	DISS. (PPM)			
22 - SW	DAWSON STREE	JUNE 4/69	4.5	220	10	210	0.3	>1,000,000	4,000
23 - R	HWY. 17 - E BRIDGE	JUNE 4/69	0.8	80	10	70	0.1	320	160
24 - SE	O.P.P. OUTFALL	JUNE 4/69	0.4	360	5	365	0	0	0
25 - SE	HWY. 17 - B DITCH (N-E)	JUNE 4/69	7.0	350	25	325	0.1	>1,000,000	>10,000
26 - SE	HWY. 17 - DITCH (S-E)	JUNE 4/69	1.8	350	10	340	0.1	6,000	4,000
27 - SE	ELLIOT STREET	JUNE 4/69	3.5	370	25	345	0.3	150,000	20,000
28 - R	RIVER AT PEACHEY ST.	JUNE 4/69	1.6	270	130	140	0.1	4,300	730
29 - SE	PEACHEY ST.	JUNE 4/69	7.5	210	40	170	0.8	>1,000,000	>10,000
30 - RE	GENELLE ST.	JUNE 4/69	7.5	210	40	170	0.8	200	200
31 - RW	LORNE ST.	JUNE 4/69	11	160	50	110	0.8	290,000	250,000
32 - R	SHERWOOD RD. BRIDGE	JUNE 5/69	1.0	80	15	65	0.1	900	90
33 - R	RIVER AT GOVERNMENT ROAD BRIDGE	JUNE 5/69	0.4	80	10	70	0	1,000	190
34 - SE	FRANCES ST. E.	JUNE 4/69	1.2	100	25	75	0.1	220,000	130,000
35 - LE	LAKE HURON AT VENEER PLANT	JUNE 5/69	0.6	90	5	85	0	90	60
36 -	BIRCHLAND VENEER DITCH	JUNE 5/69	180	780	50	730	-	-	-
37 - RW	RED CROSS HOSPITAL	JUNE 5/69	160	580	170	410	19.0	110,000,000	2,300,000
38 - LW	DITCH AT LAKESIDE BEACH	JUNE 5/69	2.0	160	20	140	3	1,000	1,000

NOTE:

R = RIVER

S = SEWER

E = EAST SIDE

W = WEST SIDE

L = LAKE

> = GREATER THAN

mouth.

8.1 Chemical

The OWRC objectives governing sewer outfalls are 15 ppm for both BOD and suspended solids. On this basis, 83 per cent of the sewer outfalls sampled exceeded the objectives.

The analyses of the river samples revealed that the BOD levels at 48 per cent of the locations sampled exceeded this Commission's objective of 4 ppm for natural watercourses.

8.2 Bacteriological

A total of 35 river and outfall samples were collected for bacteriological analyses. All of these except the OPP outfall contained coliform bacteria and all but two contained fecal coliforms. The Commission's objective for total coliform bacteria is 2400 per 100 ml. On this bases, 77 per cent of the samples exceeded the objective.

All areas of the town are contributing heavily to the overall pollution problem as indicated by the analytical results, however, if a staged programme were to be introduced by the municipality due to financial problems it would be best, from the pollution viewpoint, to service the north-west and south-east areas in the first stage. Reference should be made to map number 1 for a description of the areas involved.

9. PROPOSED SEWAGE WORKS

In 1966 a preliminary survey was conducted by Proctor and Redfern, Consulting Engineers for the OWRC. On May 10, 1967, a site inspection of the area, proposed for the construction of an oxidation ditch to service the town, was carried out and found to be satisfactory.

During May, 1968, a formal proposal was presented to the town by the OWRC. The proposal related to provision of the town's entire sewage works requirements and that the estimated annual charge per typical home was \$201.20 per year.

In response, the municipality advised that the proposal was prohibitive, both with respect to the annual home charge and to the estimated annual revenue requirement which substantially exceeded the town's annual for revenue.

The Division of Sanitary Engineering subsequently defined a staged programme of construction, but when the final financial analyses were completed, the reduction of the typical home charge was only \$33.66. The town council again felt that a charge of \$170.54 was too costly for the local residents and the revision was rejected in February, 1969. The matter at present is being reviewed again to determine if further modification can be implemented.

10. SUMMARY

On June 3rd and 4th, 1969, a water pollution survey was conducted in the Town of Thessalon. As shown in the previous surveys of 1967 and 1963 and during the present study, pollution of the Thessalon River is continuing at an accelerated level. The only ultimate solution is the installation of a sanitary sewerage system with adequate treatment facilities. Even though the cost is high, this step must be taken to ensure the safety of the local residents and tourists visiting the locality. In addition, the implementation of such a sewerage facility would curtail pollution and insure the continued supply of one of Thessalon's largest incomes - that of the tourist trade.

11. RECOMMENDATIONS

It is recommended that the municipality proceed with the construction of a sanitary sewerage system and treatment works.

Prepared by:

H. Kresin

H. Kresin,
Engineer,

Division of Sanitary Engineering.

/ek

APPENDIX A

TOWN

of

THESSALON

- Definition of Terms -

APPENDIX A

DEFINITION OF TERMS

BOD (Biochemical Oxygen Demand)

The Biochemical Oxygen Demand (BOD) is a measure of the amount of oxygen required for the natural stabilization of decomposable organic matter present in sewage. OWRC objectives allow concentrations in natural waters and waste discharges of no greater than 4.0 and 15.0 ppm (parts per million) respectively.

ABS (Alkylbenzene Sulphonate)

The Alkylbenzene Sulphonate (ABS) is a surfactant extensively used in detergents and so is present in domestic sewage at levels averaging approximately 10 ppm. Rivers usually contain trace quantities of about 0.1 ppm while ground water supplies range from zero to several parts per million depending upon the pollution of the aquifer by domestic wastes.

SOLIDS

The solids content of a liquid is expressed as total, suspended and dissolved solids. The latter is determined by subtracting the first two solids and all three are expressed in ppm. The suspended solids figure is the most important since it represents that portion which is carried down-current and later deposited. The OWRC's objective for discharge of this material is a concentration less than 15 ppm.

COLIFORMS

Coliform bacteria are commonly found in the intestinal tract of man and other animals. They are therefore used as an indication of pollution. In polluted water, their concentration is roughly proportional to the degree of sewage contamination present. The acceptable limit for natural watercourses is a concentration of less than 2400 organisms per 100 millilitres of water.

FECAL COLIFORMS

The fecal coliforms are coliform bacteria usually associated only with the fecal discharges of man and other warm blooded animals and as such their presence indicates positive excretion into the water body. When this coliform is present in a water, it is assumed that the water is potentially dangerous.

APPENDIX B

TOWN

of

THESSALON

- Methods of Financing -

APPENDIX B

IMPLEMENTATION OF SEWAGE WORKS PROGRAMS

Currently, there are three general methods which may be utilized for implementing sewage works programs. These are: 1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, 2) by requesting the provision of service from a Provincially-owned project, and 3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Sections 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects constructed under this agreement are determined as follows:

1. Capital Repayment

As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of the Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amount of ten times the initial annual billing and the reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible

only for the operating costs directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALY-OWNED WORKS

In June, 1967, the Honourable J.R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new program allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40-year period.

A slight variation of this program could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

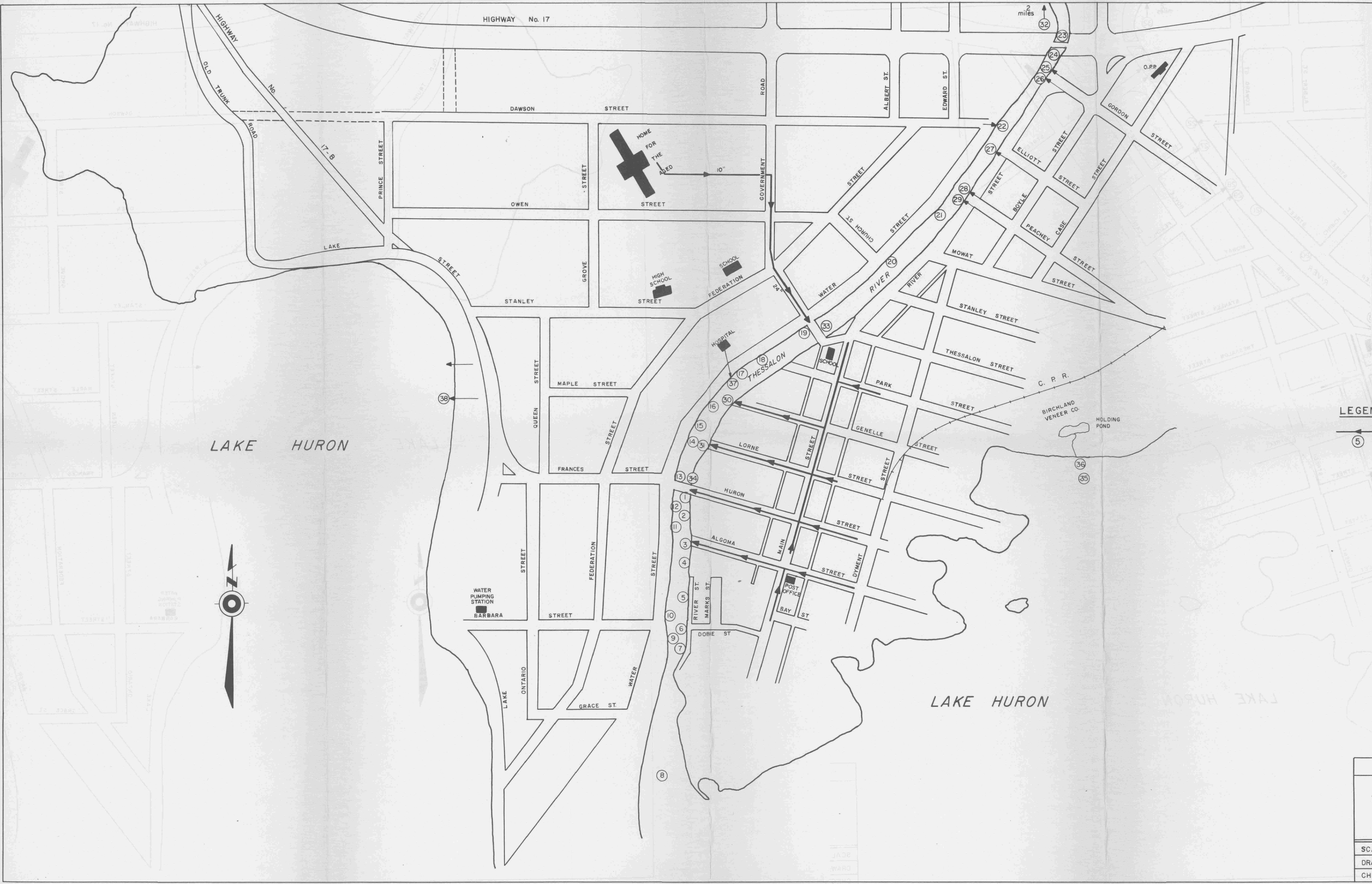
The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the affected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the Municipal council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the Council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate

a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.



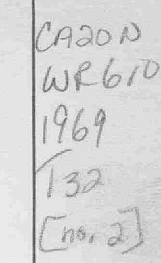
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— EXISTING SEWERS
⑤ SAMPLING STATION

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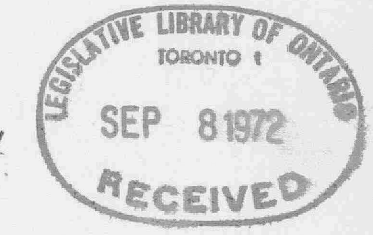
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TOWN OF THESSALON SHOWING SEWERAGE SYSTEM AND SAMPLING STATIONS MAP. No. 1.	
SCALE: 200' 100' 0 200' 400' 600' FT.	
DRAWN BY: M. SUPER	DATE: JUNE, 1969
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ONTARIO WATER RESOURCES COMMISSION

TOWN OF THESSALON
LAND USE
MAP. N° 2

SCALE:  FT.	
DRAWN BY: M. SUPER	DATE: JUNE, 1969
CHECKED BY:	DRAWING No: 69 - 79 - DE.

BOREHOLES

BOREHOLE No.1	BOREHOLE No.2	BOREHOLE No.3	BOREHOLE No.4	BOREHOLE No.5
0 FINE SAND 5 ORGANIC SILT 6.5 VARVED CLAYEY SILT 17.5	0 SILT 4.5 VARVED CLAYEY SILT 14	0 SILT 4.5 ORGANIC SILT 7.5 VARVED CLAYEY SILT 17.5	0 CLAY 5 VARVED CLAY 13.8 GRANITE BEDROCK 18.8	0 SAND & GRAVEL 3 VARVED CLAYEY SILT 10 VARVED CLAY 20

BOREHOLE No.6	BOREHOLE No.7	BOREHOLE No.8	BOREHOLE No.9	BOREHOLE No.10
0 GRAVELLY SAND 25 SAND 6 VARVED CLAY 19 SILTY SAND 20	0 SAND 1.5 VARVED CLAYEY SILT 4 GRANITE BEDROCK 9	0 ORGANIC SILT 8 VARVED CLAYEY SILT 14 SAND 20	0 FINE SAND 9 VARVED CLAYEY SILT 19 SAND 20	0 FINE SAND 5 ORGANIC SILT 20

BOREHOLE No.11	BOREHOLE No.12	BOREHOLE No.13	BOREHOLE No.14	BOREHOLE No.15	BOREHOLE No.16
0 ORGANIC SILT 7 SAND 10 ORGANIC SILT 16	0 SANDY SILT to SAND 5 ORGANIC SILT 14 VARVED CLAYEY SILT 16	0 VARVED CLAY 10 SILTY SAND 16	0 VARVED CLAYEY SILT 6 SILTY SAND 10	0 ORGANIC SILT 15 VARVED CLAYEY SILT 16	0 SILTY SAND 13 SAND 17

BOREHOLE No.17	BOREHOLE No.18	BOREHOLE No.19	BOREHOLE No.20	BOREHOLE No.21	BOREHOLE No.22
0 SILTY CLAY 4 SILTY SAND 11.4	0 SILTY SAND 15 SAND 15.2	0 VARVED CLAYEY SILT 2 SILTY SAND 16	0 SILTY FINE SAND 2 SILTY SAND 10	0 GRAVELLY SAND 8 SAND 14.5	0 VARVED CLAY 14.5 SILTY SAND 16

LEGEND
ASPHALT
TOPSOIL
GRAVEL
SILT
CLAY
SAND
ROCK



CHADON
WR 610
1969
132
[no. 3]

Out
Environ
Water Treat.



ONTARIO WATER RESOURCES COMMISSION

TOWN OF THESSALON
SOILS PLAN
MAP. No. 3

SCALE: 200' 100' 0' 200' 400' 600' FT.

DRAWN BY: M. SUPER DATE: JUNE, 1969

CHECKED BY: DRAWING No: 69-80-DE.



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